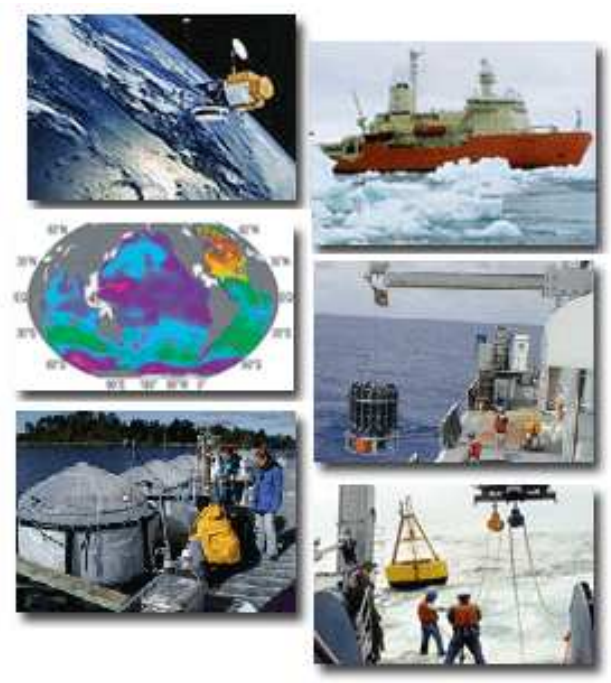
The U.S. National Science Foundation Establishes the First Grant Agreement with UNESCO's Intergovernmental Oceanographic Commission for Ocean Carbon Research Support



The International Ocean Carbon Coordination Project promotes the development of a global network of ocean carbon observations for research. (Photo © IOCCP)

The U.S. National Science Foundation has awarded UNESCO a three-year grant to support two Ph.D. personnel in managing the ocean carbon programs of the Intergovernmental Oceanographic Commission (IOC). Awarded earlier this month, this is the first direct grant agreement between the U.S. National Science Foundation and UNESCO.

The IOC serves as a liaison between the international research community and UN mandates that specifically call on the Commission to develop a global network of systematic observation and research on the ocean's role as a sink for atmospheric carbon dioxide, and to assess the state of the marine environment in response to a changing climate.

The ocean carbon programs of the IOC are under the direction of Dr. Maria Hood, an NSF-supported member of the UNESCO-IOC staff since 1999.

Dr. Hood describes the carbon programs as a "good news / bad news" story. The good news is that the ocean absorbs approximately 30% of the CO_2 emitted to the atmosphere from fossil fuel burning, significantly reducing the impact on climate. Understanding how this sink works and how it will behave in the future under changed climate conditions is crucial for initiatives to reduce atmospheric CO_2 concentrations. The bad news is that this ecosystem service provided by the ocean comes at a steep ecological cost – a sharp drop in seawater pH levels, called "ocean acidification". When CO_2 enters seawater, chemical reactions reduce the pH of the

water, making it more acidic. By the end of this century, if CO_2 concentrations continue to grow unabated, we will see changes in ocean pH that are 3 times larger and 100 times faster than the transitions from glacial to interglacial periods. Such large changes in ocean pH have probably not been experienced on the planet for at least the past 21 million years. How or if ocean ecosystems will adapt is unknown.

In the 1990s, the first global survey of ocean carbon was carried out to determine how much CO_2 the ocean was absorbing. This global survey is now repeated every decade to look at changes in CO_2 uptake and to learn more about the nature of those processes so that we can predict how it will behave in the future. Conducting such a global survey requires considerable coordination of the scientific community as well as the governments that commit to implementing it. The International Ocean Carbon Coordination Project (IOCCP), sponsored by the IOC and the Scientific Committee on Oceanic Research (SCOR), works with scientists and their governments to develop survey strategies and implementation plans, and then works to ensure that the research teams are making measurements using internationally-agreed upon methods. Once the surveys are completed, the IOCCP works with national and regional research programs to bring those data together to create a global synthesis.

In 2004, the IOC and SCOR held the first international symposium to focus on ocean acidification. The 1st Ocean in a High CO_2 World Symposium, held at UNESCO in May 2004, brought together the world's leading experts to assess what was known about the dangers of ocean acidification. Evidence that acidification was real and already happening sounded the alarm for the international scientific community and the symposium was rapidly followed by special reports from organizations such as the Royal Society of London and the U.S. National Science Foundation. The IOC was encouraged to keep this issue under review at the highest levels, and the IOC Assembly agreed to make this a regular event to be held every 4 years. The 2nd Ocean in a High CO_2 World Symposium will be held in Monaco in October of this year, under the patronage of His Serene Highness Albert II, Sovereign Prince of Monaco. The symposium will also be co-sponsored by SCOR, the International Atomic Energy Agency's Marine Environmental Laboratory, and the International Geosphere-Biosphere Programme.

Links of interest

The International Ocean Carbon Coordination Project (IOCCP)
www.ioccp.org
The Ocean Acidification Network – an information network for the international scientific community
www.ocean-acidification.net
The U.S. National Science Foundation
http://www.nsf.gov/